

**IDENTIFICATION OF BACTERIA *Escherichia coli* IN SIOMAY SAUCE AROUND LIMBOTO CULTURE PARK GORONTALO DISTRICT**

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**ABSTRACT**

Siomay sauce is a liquid or thick product that is added to dumplings. The cleanliness of sauces is often neglected, given the way this food is made and sold is susceptible to bacterial contamination that can harm health. *Escherichia coli* comes from feces which are part of the normal microflora, transmitted into food due to unhygienic behavior during food processing or processing, use of contaminated water, and washing of unclean equipment.

This study aims to determine the presence of *Escherichia coli* bacteria in siomay sauce around Limboto Cultural Park, Gorontalo Regency. The type of research used is descriptive observational. The sampling technique was a total sampling of 10 samples.

Based on the results of research conducted on EMBA media, there was no metallic green color change so that all samples did not contain *Escherichia coli*. The conclusion from the 10 samples studied did not contain *Escherichia coli* bacteria

**Keywords:** *Escherichia coli*, Siomay Sauce

**INTRODUCTION**

Snacks are meals served by traders to consumers. Street food is food that is usually eaten immediately without further processing or preparation which is sold by street vendors on the streets and crowded places. The price is relatively cheap with not high nutritional quality and low level of hygiene but is very popular with the community [13].

Siomay snacks are one of the foods sold on the side of the road that uses a food complementary ingredient in the form of sauce. Siomay sauce is a liquid or thick product that is added to dumplings when served to enhance the appearance, aroma, and taste of the food [17].

However, in everyday life, the cleanliness of sauces is often neglected, considering the way this food is made and sold is susceptible to bacterial contamination that can harm health. This is certainly one of the factors in decreasing the level of public health when consuming siomay sauce which has been contaminated by various types of microorganisms [7].

The types of food sold by small traders are more likely to be contaminants than those from well-equipped wholesalers. The type of food that is served cold, be it food or drink has a worse microbial content than those prepared hot [8]. Some of the microbes that make toxins, both exotoxin and

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endotoxin, are classified as Salmonella, *Escherichia coli*, Staphylococcus, Clostridium, Bacillus cocovenans, Bacillus cereus. Salmonella sp and *Escherichia coli* are the most common bacteria infecting food. Sauce microbial contamination caused by cooking temperature less than 65° C [9].

Bacterial contamination in food causes food to be easily damaged and can reduce the quality of the food. Unsafe food will cause acute and chronic food borne disease, including diarrhea, food poisoning and others which can be caused by foods that are not safe for consumption [10].

Diseases that are usually related to food are caused due to poor food processing which is influenced by environmental factors (physical, biological, and chemical) and behavioral factors, namely the cleanliness of the person handling food, generally does not meet health requirements, environmental cleanliness, availability of supporting facilities, and raw material conditions [6].

Worldwide there are millions of people due to food borne diseases. Each year, there are approximately 1500 million incidents of diarrhea and an estimated 70% of cases of diarrheal disease occur due to contaminated food [3]. Diarrheal disease is still a public health problem in developing countries such as Indonesia. The target service coverage for diarrhea sufferers of all ages (SU) who come to health facilities is 10% of the estimated number of diarrhea sufferers SU (diarrhea incidence SU multiplied by the population in one work area within one year) In 2017, there were 4,274,790 SU diarrhea sufferers served in health facilities and an increase in 2018 was 4,504,524 sufferers or 62.93% of the estimated diarrhea in health facilities. The national incidence of diarrhea for all ages is 270 / 1,000 population [12].

Especially in Gorontalo Province, the prevalence of diarrheal disease has increased when compared to the 2013 Riskesda, the prevalence of diarrheal disease has increased from 4.8% to 6.8%. Especially in the Gorontalo Regency area, the number of diarrhea diseases in 2019 was 6,414 patients and at the Limboto Health Center the number of diarrhea diseases in 2020 was 223 sufferers.

Previous research conducted showed that from 10 samples of dumplings sauce from a campus area merchant in Surakarta, all samples were positive for coliform and *Echerichia coli* bacteria. And it is supported by previous research showing that from 12 samples of meatball meatball snack sauce in Manado were contaminated by *Echerichia coli* bacteria. Whereas in the previous study of the 39 samples studied in the roasted meatball sauce, 6 samples of *E. coli* bacteria were found and in the chili sauce, 23% *E. coli* bacteria were found as many as 8 samples.

*Echerichia coli* originates from feces which are part of the microflora normally present in the digestive tract of humans and animals, are transmitted into food due to unhygienic behavior during food processing or processing, use of contaminated water, and washing of unclean equipment .

Based on the results of observations made on the dumplings hawker seller in one of the parks in Gorontalo District, Limboto Cultural Park, it shows that the park is the place most frequently visited by the community to find food or just take a walk. During the sales process, the cart used was unfit or dirty, the dumpling sauce storage container was open, and some sellers placed their carts close to the trash cans.

Based on the description above, researchers are very interested in conducting research with the title "Identification of *Escherichia coli* Bacteria

in Siomay Sauce Around Limboto Cultural Park, Gorontalo District".

### RESEARCH METHODS

The type of research used is research *observational descriptive* which aims to describe the existence Escherichia coli bacteria in siomay sauce around Limboto Cultural Park, Gorontalo District, with a quantitative approach [15]. The research design used in this study was cross sectional. Cross sectional, a study conducted in a situation where the researcher intends to collect data that emphasizes the time of measurement / observation [15]. This research was conducted on 16-21 October 2020. Sampling was taken around the Limboto Cultural Park, Gorontalo District. Sample testing has been carried out at the Microbiology Laboratory, Bina Mandiri University Gorontalo. The population used in this study were all dumplings that are sold around the Limboto Cultural Park, Gorontalo District. The sample used was the dumplings sauce that was taken or bought from the dumplings seller which consisted of 10 dumplings sellers around Limboto Cultural Park, Gorontalo District. In this study, researchers conducted a sampling technique by means of total sampling. Total sampling is a sampling technique where the number of samples is the same as the population or take all the dumplings that are sold around Limboto Cultural Park as a sample. [23].

The research data from the identification of Escherichia coli bacteria in siomay sauce around the Limboto Cultural Park, Gorontalo Regency, were analyzed descriptively in the form of a table to explain the data or data characteristics objectively and systematically from the sample studied. [23].

### RESEARCH RESULT

The results of the research on the identification of Escherichia coli bacteria carried out in the Microbiology laboratory at Bina Mandiri University Gorontalo with samples of snack dumplings traded around the Limboto Cultural Park are presented in Table 1.

**Table 1.**  
*Observation Results on NB Media (Nutrient Broth)*

No	Kode Sampel	Warna	Keterangan
1.	S.1	Kuning Keruh	Adanya bakteri
2.	S.2	Kuning Keruh	Adanya bakteri
3.	S.3	Kuning Keruh	Adanya bakteri
4.	S.4	Kuning Keruh	Adanya bakteri
5.	S.5	Kuning Keruh	Adanya bakteri
6.	S.6	Kuning Keruh	Adanya bakteri
7.	S.7	Kuning Keruh	Adanya bakteri
8.	S.8	Kuning Keruh	Adanya bakteri
9.	S.9	Kuning Keruh	Adanya bakteri
10.	S.10	Kuning Keruh	Adanya bakteri

Table 1 shows that there are 10 positive samples which are marked by a change in color from clear yellow to cloudy yellow on NB media (Nutrient Broth), from the results of culture on NB media all show turbidity which means that there are bacteria that grow or live in the media. Then proceed to selective media, namely EMBA media (Eosin Methylene Blue Agar) by means of scratches. The results are shown in Table 4.2

**Table 2.**  
*Observation Results on EMBA (Eosin Methylene Blue Agar) media*

Kode Sampel	Bentuk	Warna	Keterangan
S.1	Bulat	Bulat Hitam	Tidak Tumbuh <i>E.coli</i>
S.2	-	-	Tidak Tumbuh <i>E.coli</i>
S.3	Bulat	Pink, bulat hitam	Tidak Tumbuh <i>E.coli</i>
S.4	-	-	Tidak Tumbuh <i>E.coli</i>
S.5	Bulat	Pink, ungu	Tidak Tumbuh <i>E.coli</i>
S.6	Bulat	Putih, pink, hitam	Tidak Tumbuh <i>E.coli</i>
S.7	Bulat	Pink, hitam, ungu	Tidak Tumbuh <i>E.coli</i>
S.8	Bulat	Pink, ungu	Tidak Tumbuh <i>E.coli</i>
S.9	Bulat	Pink, ungu	Tidak Tumbuh <i>E.coli</i>
S.10	Bulat	Putih, pink	Tidak Tumbuh <i>E.coli</i>

### DISCUSSION

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Sauce is one type of food and flavor that is often served with a variety of foods, one of which is dumplings which are very popular among people from children to adults. Under certain circumstances the sauce can be contaminated with bacteria, one of which is *Escherichia coli* [9].

*Escherichia coli* bacteria contamination in food can be caused by poor hygiene and sanitation conditions at the place of food handling. Chances of food contamination can occur at any stage of food processing. Unhygienic food management can result in ingredients in food that can cause health problems for consumers [12].

*Escherichia coli* can live in a variety of places and conditions including food. Water contaminated by the *Escherichia coli* bacteria cannot be used for food management purposes such as cooking, washing cutlery, and washing food ingredients. This allows the transfer of *Escherichia coli* from water to food so that it can cause disease [14].

*Escherichia coli* is a member of the normal intestinal flora which plays an important role in the synthesis of vitamin K, conversion of bile pigments, bile acids and absorption of food substances. *Escherichia coli* belongs to heterotrophic bacteria which obtain food in the form of organic substances from their environment because they cannot compile the organic substances they need. Organic matter is obtained from the remains of other organisms. These bacteria break down the organic substances in food into inorganic substances, namely CO<sub>2</sub>, H<sub>2</sub>O, energy, and minerals. If outside the intestine or in the digestive tract the number of *Escherichia coli* increases, it will become a pathogen so that it produces enterotoxins that can cause disease, one of which is diarrhea. *Escherichia coli* associated with enteropathogenic produces enterotoxins in

epithelial cells, causing disease, one of which is diarrhea.

EMBA media is a selective medium for the isolation of *Escherichia coli* bacteria. EMBA contains the carbohydrate lactose, in the presence of these carbohydrates. The color before bacterial fertilization on EMBA media was purplish red. The color change to metallic green in this medium is due to the fact that *Escherichia coli* bacteria can ferment lactose which increases the acid level in the media [4].

EMB media can be used for the isolation and differentiation of enteric or Coliform bacteria. EMB media contains lactose so that it can distinguish between types of bacteria with the ability to ferment lactose, bacteria that can ferment lactose, one of which is *Escherichia coli*. metal. Apart from *Escherichia coli*, the bacteria *Enterobacter aerogenes* and *Klebsiella sp* can also ferment lactose but not as fast as *Escherichia coli* because the bacteria *Enterobacter aerogenes* and *Klebsiella sp* have weak acid production properties so that the colony formed is pink in accordance with the acidic properties that are formed [22].

Based on the research results, it was found that all sample of dumplings sauce around Limboto Cultural Park, Gorontalo Regency, is not present or not contaminated with *Escherichia coli* bacteria. The factor that causes the dumplings to be free from *Escherichia coli* is because it goes through a good processing process and the dumplings sauce before being sold is cooked first, in the cooking process it can kill *Escherichia coli* because the bacteria cannot withstand heat, especially when the temperature is above 50°C. *Escherichia coli* can live on temperature range 20-40°C with the optimum temperature 37°C under the best conditions. *Escherichia coli* bacteria are usually present in undercooked or

uncooked / pasteurized foods and contaminated water [1].

Another factor that causes the dumpling sauce to be free from *Echerichia coli* is because the traders around Limboto Cultural Park apply personal hygiene, such as when pouring the sauce on the dumplings using a sauce ladle and some who use gloves even if only with a plastic bag.

Unlike the previous research conducted, it was found that from 10 samples of dumplings sauce from the campus area traders in Surakarta, all samples were positive for coliform and *Echerichia coli* bacteria. And it is supported by previous research showing that from 12 samples of meatball snack sauce in Manado were contaminated by *Echerichia coli* bacteria. Whereas in the previous study of the 39 samples studied in the roasted meatball sauce, 6 samples of *E. coli* bacteria were found and in the chili sauce, 23% *E. coli* bacteria were found as many as 8 samples.

The absence of *Echerichia coli* bacteria in the siomay sauce around the Limboto Cultural Park in Gorontalo Regency cannot be said to be free from microorganisms because the media is suspected of having other bacteria.

## CONCLUSION

Based on the results of research on the identification of *Escherichia coli* bacteria in siomay sauce around the Limboto Cultural Park, Gorontalo Regency, it can be concluded that all 10 samples did not contain *Escherichia coli* bacteria.

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